

**Science Standard
Articulated by Grade Level**

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Science Standard Articulated by Grade Level

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Science Standard Articulated by Grade Level

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Science Standard

Articulated by Grade Level

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Science Standard

Articulated by Grade Level

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Science Standard Articulated by Grade Level

EXTERNAL REVIEWERS/CONSULTANTS

Reynaldo Gomez, Ph.D., (Arizona State University) is an Associate Professor of Early Childhood Education. He teaches undergraduate and graduate courses in early childhood education curriculum and play, and classroom organization and management. His research focus is on children's play as it relates to their growth and development, parental involvement in early childhood programs, and the development of appropriate playgrounds for children.

Thomas M. Haladyna, Ph.D., (Arizona State University West) is a Professor of Educational Psychology and a nationally known expert on testing. He has received a yearlong appointment as a visiting scholar at the Educational Testing Service (ETS) in Princeton, N.J., and participated in the National Assessment of Educational Progress Testing Program. He has written several books and journal articles about achievement testing and has served as a consultant on testing issues for many clients, including state departments of education, school districts, and national certification and licensing boards. Dr. Haladyna's research focuses on test score validity. He is a member of the National Assessment and Accountability Advisory Committee for the Arizona Department of Education.

Lawrence S. Lerner, Ph.D. (California State University, Long Beach) is Professor Emeritus of Physics and Astronomy and the recipient of several university-wide Teaching Excellence awards. Dr. Lerner is the author of two university-level physics textbooks and numerous other publications in condensed-matter physics, the history of science, and science education. Dr. Lerner was a major author and editor of the content sections of the 1990 Science Framework for California Public Schools, and has been involved in state standards evaluations through the Thomas B. Fordham Foundation, authoring several publications including *Good Science, Bad Science: Teaching Evolution in the States* and *State Science Standards*. He has also consulted with numerous state departments of education and foundations on matters concerning K-12 science standards. He has been a contributing editor to *The Textbook Letter*, which evaluates middle- and secondary-school texts in science and other subjects, and a member of the National Faculty for the Humanities, Arts, and Sciences.

Jane Maienschein, Ph.D., (Arizona State University) is a Regents' Professor and Director for the Center for Biology and Society. She specializes in the history and philosophy of biology and the way that biology, bioethics, and biopolicy play out in society. Focusing on research in embryology, genetics, and cytology, Dr. Maienschein combines detailed analysis of the epistemological standards, theories, laboratory practices and experimental approaches with study of the people, institutions, and changing social, political, and legal context in which science thrives. She loves teaching and is committed to public education about biology and its human dimensions. She contributed to the development of the Arizona Science Standards, adopted in 1998 and has received numerous faculty and teaching awards, including the 2000 Parents Association Professor of the Year Chair. She is a co-editor of the *Journal of the History of Biology*, and has published books, including *Whose View of Life? Embryos, Cloning, and Stem Cells* and *Transforming Traditions in American Biology*.

Science Standard

Articulated by Grade Level

Peter Rillero, Ph.D., (Arizona State University West) is an Associate Professor in Science Education. He conducts academic and service activities in science education, teaches site-based courses in elementary science and social studies methods for junior and senior students, an elementary science methods course for post-degree students, and a secondary biology methods course for the Department of Life Sciences. In addition to the numerous journal articles, books, and publications he has authored and co-authored, he is a consulting editor and book reviewer for *Science Activities* journal; a member of the Board of Directors of the Arizona Alliance for Science, Mathematics, and Technology; and a reviewer for the *Electronic Journal of Science Education*.

Dennis Sunal, Ph.D. (University of Alabama) is a Professor of Science Education and the Project Director of NASA's Project NOVA. His research interests include the impact of innovative course design and pedagogy on undergraduate student learning; the nature of science; research, design, and best practice in online learning; scientific reasoning: exploring characteristics of student's argumentation of science concepts; learning and teaching energy concepts, K-12: misconceptions and conceptual reconstruction strategies; and alternative conceptions of aerospace concepts by college students.